REMARKS

This is a full and timely response to the non-final Office Action of April 28, 2006.

Reexamination, reconsideration, and allowance of the application and all presently pending

claims are respectfully requested.

Upon entry of this Second Response, claims 1-3, 6-8, 10, 11, 13, 16, 18-20, and 22-26 are

pending in this application. Claims 1, 6-8, 10, 11, 13, 16, 18, and 19 are directly amended

herein. Further, claims 9, 12, 15, 17, and 21 are canceled without prejudice or disclaimer, and

claims 22-26 are newly added. It is believed that the foregoing amendment adds no new matter

to the present application.

Response to §103 Rejections

In order for a claim to be properly rejected under 35 U.S.C. §103, the combined teachings

of the prior art references must suggest all features of the claimed invention to one of ordinary

skill in the art. See, e.g., *In Re Dow Chemical Co.*, 837 F.2d 469, 5 U.S.P.Q.2d 1529, 1531 (Fed.

Cir. 1988), and *In re Keller*, 642 F.2d 413, 208 U.S.P.Q. 871, 881 (C.C.P.A. 1981). In addition,

"(t)he PTO has the burden under section 103 to establish a *prima facie* case of obviousness." *In*

re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988).

Claim 1

Claim 1 presently stands rejected under 35 U.S.C. §103 as purportedly being obvious to

Leung (U.S. Patent No. 5,784,588). Claim 1 reads as follows:

> 1. A computer system for processing instructions of a computer program, comprising:
> a plurality of registers;
> a plurality of connections corresponding respectively with said registers;
> at least one pipeline configured to process and execute said instructions;
> decoding circuitry coupled to said at least one pipeline, said decoding circuitry configured to decode a plurality of encoded register identifiers associated with said instructions into a plurality of decoded register identifiers, said one of said decoded register identifiers having a plurality of bits identifying at least one of said registers, each bit of said one decoded register identifier corresponding with a respective one of said plurality of registers;
> a scoreboard coupled to said plurality of connections and said decoding circuitry, said scoreboard having a plurality of bits corresponding respectively with said plurality of registers, said scoreboard configured to transmit each of said bits across a different one of said connections, each of said bits indicative of whether a pending write to a corresponding one of said registers exists, *said scoreboard configured to update at least one of said bits of said scoreboard based on said one decoded register identifier*; and
> hazard detection circuitry coupled to each of said plurality of connections and to said decoding circuitry, *said hazard detection circuitry configured to receive each of said decoded register identifiers from said decoding circuitry and to detect data hazards by comparing bits of said decoded register identifiers, including at least one bit of said one decoded register identifier, to said bits transmitted by said scoreboard.* (Emphasis added).

Applicants respectfully assert that *Leung* fails to suggest or teach at least the features of pending

claim 1 highlighted hereinabove. Therefore, the 35 U.S.C. §103 rejection of claim 1, as

amended, is improper.

In this regard, *Leung* appears to suggest a "scoreboard" that tracks "which floating point

registers have outstanding updates." See column 9, lines 25-28. However, *Leung* fails to

suggest a "decoded register identifier" that is *both* used to update the "scoreboard" and compared

to the bits of the scoreboard, by "hazard detection circuitry," in order to detect data hazards.

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Thus, *Leung* fails to suggest a "scoreboard configured to update at least one of said bits of said scoreboard based on said one decoded register identifier" and "hazard detection circuitry" that is configured "to detect data hazards by comparing bits of said decoded register identifiers, including at least one bit of said one decoded register identifier, to said bits transmitted by said scoreboard," as recited by claim 1.

For at least the above reasons, Applicants respectfully assert that the cited art fails to suggest each feature of pending claim 1. Accordingly, the 35 U.S.C. §103 rejection of claim 1 should be withdrawn.

Claims 2, 3, and 6

Claims 2, 3, and 6 presently stand rejected in the Office Action under 35 U.S.C. §103 as allegedly being unpatentable over *Leung*. Applicants submit that the pending dependent claims 2, 3, and 6 contain all features of their respective independent claim 1. Since claim 1 should be allowed, as argued hereinabove, pending dependent claims 2, 3, and 6 should be allowed as a matter of law for at least this reason. *In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988).

Claim 7

Claim 7 presently stands rejected under 35 U.S.C. §103 as purportedly being obvious to *Leung*. Claim 7 reads as follows:

> 7. A system for processing instructions of computer
> programs, comprising:
>> at least one pipeline;
>> a plurality of registers;
>> a plurality of connections, each of said connections corresponding to a
> different one of said registers;
>> a decoder configured to decode a register identifier from said at least one
> pipeline to a decoded register identifier having a first plurality of bits, each of said

first plurality of bits corresponding with a respective one of said plurality of registers, said decoded register identifier identifying at least one of said registers;

means for maintaining a second plurality of bits and for indicating via said second plurality of bits which of said registers is associated with a pending write, said maintaining means configured to transmit said second plurality of bits across said connections, wherein each bit transmitted across each of said connections is indicative of whether the register corresponding to said each connection is associated with a pending write, *said maintaining means further configured to update said second plurality of bits based on said decoded register identifier; and*

hazard detection circuitry configured to perform comparisons between said second plurality of bits and a said decoded register identifier said hazard detection circuitry further configured to detect at least one data hazard based on said comparisons. (Emphasis added).

For at least reasons similar to those described above in the arguments for allowance of claim 1, Applicants respectfully assert that the cited art fails to suggest at least the features of claim 7 highlighted above. Therefore, the 35 U.S.C. §103 rejection of claim 7, as amended, should be withdrawn.

Claims 8 and 9

Claims 8 and 9 presently stand rejected in the Office Action under 35 U.S.C. §103 as allegedly being unpatentable over *Leung*. Applicants submit that the pending dependent claims 8 and 9 contain all features of their respective independent claim 7. Since claim 7 should be allowed, as argued hereinabove, pending dependent claims 8 and 9 should be allowed as a matter of law for at least this reason. *In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988).

Claim 11

Claim 11 presently stands rejected under 35 U.S.C. §103 as purportedly being obvious to

Leung. Claim 11 reads as follows:

> 11. A method for processing instructions of computer programs,
> comprising the steps of:
> processing said instructions via at least one pipeline;
> providing a plurality of registers;
> ***receiving an encoded register identifier from said at least one pipeline;***
> ***decoding said received register identifier into a decoded register identifier;***
> ***updating at least one of said bits based on said decoded register identifier;***
> maintaining a plurality of bits, each of said bits indicating whether a
> corresponding one of said registers is associated with a pending write;
> transmitting a data word, said data word including each of said bits,
> wherein each asserted bit in said data word indicates that a different one of said
> registers is associated with a pending write;
> receiving said data word;
> ***comparing said data word to a said decoded register identifier; and***
> ***detecting a data hazard based on said comparing step.*** (Emphasis
> added).

For at least reasons similar to those described above in the arguments for allowance of claim 1,

Applicants respectfully assert that the cited art fails to suggest at least the features of claim 11

highlighted above. Therefore, the 35 U.S.C. §103 rejection of claim 11, as amended, should be

withdrawn.

Claim 13

Claim 13 presently stands rejected under 35 U.S.C. §103 as purportedly being obvious to

Leung. Claim 13 reads as follows:

> 13. A method for processing instructions of computer programs,
> comprising the steps of:
> processing said instructions via at least one pipeline;
> providing a plurality of registers;
> decoding at least one register identifier associated with at least one of said
> instructions into a decoded register identifier having a plurality of bits, each of

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said bits corresponding with a respective one of said plurality of registers, said decoded register identifier identifying at least one of said registers;

maintaining a plurality of bits within a scoreboard, each of said scoreboard bits respectively corresponding with one of said registers;

providing a plurality of connections, each of said connections respectively corresponding with one of said registers;

indicating, via said scoreboard bits, which of said registers are associated with pending writes;

transmitting, from said scoreboard, each of said scoreboard bits across a different one of said connections;

updating at least one of said scoreboard bits in said scoreboard based on said decoded register identifier;

comparing at least one of said transmitted bits to at least one of said bits of said decoded register identifier; and

detecting a data hazard based on said comparing step. (Emphasis added).

For at least reasons similar to those described above in the arguments for allowance of claim 1, Applicants respectfully assert that the cited art fails to suggest at least the features of claim 13 highlighted above. Therefore, the 35 U.S.C. §103 rejection of claim 13, as amended, should be withdrawn.

Claim 16

Claim 16 presently stands rejected under 35 U.S.C. §103 as purportedly being obvious to *Leung*. Claim 16 reads as follows:

16. A system for processing instructions of computer programs, comprising:

a plurality of registers;

a plurality of connections;

at least one pipeline;

a decoder configured to receive an encoded register identifier from said at least one pipeline and to decode said received register identifier into a decoded register identifier identifying at least one of said registers;

a scoreboard having data indicative of whether each of said plurality of registers is respectively associated with a pending write, *said scoreboard configured* to transmit said data across said connections and *to update said data based on said decoded register identifier;* and

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hazard detection circuitry coupled to said connections and configured to receive said transmitted data and to perform a comparison between said transmitted data and a said decoded register identifier, said hazard detection circuitry further configured to detect a data hazard based on said comparison. (Emphasis added).

For at least reasons similar to those described above in the arguments for allowance of claim 1, Applicants respectfully assert that the cited art fails to suggest at least the features of claim 16 highlighted above. Therefore, the 35 U.S.C. §103 rejection of claim 16, as amended, should be withdrawn.

Claim 19

Claim 19 presently stands rejected under 35 U.S.C. §103 as purportedly being obvious to *Leung*. Claim 19 reads as follows:

> 19. A method for processing instructions of computer programs, comprising the steps of:
> processing said instructions via at least one pipeline;
> using a plurality of registers to execute said instructions;
> *receiving from said at least one pipeline an encoded register identifier identifying at least one of said registers;*
> *decoding said received register identifier into a decoded register identifier identifying each of said register identified by said encoded register identifier;*
> storing, in a scoreboard, data indicative of which of said registers is associated with a pending write;
> transmitting said data from said scoreboard;
> decoding said received register identifier into a decoded register identifier identifying each of said registers identified by said encoded register identifier;
> *updating said data in said scoreboard based on said decoded register identifier;*
> *comparing said transmitted data to said decoded register identifier; and*
> *detecting a data hazard based on said comparing step.* (Emphasis added).

For at least reasons similar to those described above in the arguments for allowance of claim 1, Applicants respectfully assert that the cited art fails to suggest at least the features of claim 19

highlighted above. Therefore, the 35 U.S.C. §103 rejection of claim 19, as amended, should be withdrawn.

Claim 20

Claim 20 presently stands rejected in the Office Action under 35 U.S.C. §103 as allegedly being unpatentable over *Leung*. Applicants submit that the pending dependent claim 20 contains all features of its independent claim 19. Since claim 19 should be allowed, as argued hereinabove, pending dependent claim 20 should be allowed as a matter of law for at least this reason. *In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988).

Claim 22-26

Claims 22-26 have been newly added via the amendments set forth herein. Applicants submit that the pending dependent claims 22-26 contain all features of their respective independent claims 7, 11, 13, 16, and 19. Since independent claims 7, 11, 13, 16, and 19 should be allowed, as argued hereinabove, pending dependent claims 22-26 should be allowed as a matter of law for at least this reason. *In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988).

Allowable Subject Matter

Claim 10 has been indicated as allowable by the outstanding Office Action if such claim is rewritten to include the limitations of its base claims. Accordingly, pending claim 10 has been amended herein to include the features of its base claims 7 and 9, and Applicants respectfully request that the objection to claim 10 be withdrawn.

CONCLUSION

Applicants respectfully request that all outstanding objections and rejections be withdrawn and that this application and all presently pending claims be allowed to issue. If the Examiner has any questions or comments regarding Applicants' response, the Examiner is encouraged to telephone Applicants' undersigned counsel.

Respectfully submitted,

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